



## Section 2. Hazards identification

### Hazard pictograms



### Signal word

:  XL2-Blue MRF' ultracompetent cells

Warning

pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

No signal word.

Danger

### Hazard statements

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

H320 - Causes eye irritation.

No known significant effects or critical hazards.  
GHS SYMBOL - **Corrosion - Exclamation mark** -  
H318 - Causes serious eye damage.  
H317 - May cause an allergic skin reaction.

### Precautionary statements

#### Prevention

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

P264 - Wash hands thoroughly after handling.

Not applicable.

P280 - Wear protective gloves. Wear eye or face protection.

P261 - Avoid breathing vapor.

P272 (OSHA) - Contaminated work clothing must not be allowed out of the workplace.

#### Response

:  XL2-Blue MRF' ultracompetent cells

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 - If eye irritation persists: Get medical attention.

Not applicable.

P302 + P352 + P363 - IF ON SKIN: Wash with plenty of soap and water. Wash contaminated clothing before reuse.

P333 + P313 - If skin irritation or rash occurs: Get medical attention.

P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

#### Storage

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Not applicable.

Not applicable.

Not applicable.

#### Disposal

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Not applicable.

Not applicable.

P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

### Supplemental label elements

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

None known.

None known.

None known.

### 2.3 Other hazards

## Section 2. Hazards identification

<b>Hazards not otherwise classified</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	None known.
	pUC 18 DNA Control Plasmid	None known.
	1.22 M 2-mercaptoethanol	None known.

## Section 3. Composition/information on ingredients

<b>Substance/mixture</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Mixture
	pUC 18 DNA Control Plasmid	Mixture
	1.22 M 2-mercaptoethanol	Mixture

Ingredient name	%	CAS number
<input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells		
Glycerol	≥10 - ≤25	56-81-5
Dimethyl sulfoxide	≤10	67-68-5
Potassium chloride	≤3	7447-40-7
<b>1.22 M 2-mercaptoethanol</b>		
2-Mercaptoethanol	<10	60-24-2
Sodium chloride	≤8.8	7647-14-5

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### 4.1 Description of necessary first aid measures

<b>Eye contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. If irritation persists, get medical attention.
	pUC 18 DNA Control Plasmid	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
	1.22 M 2-mercaptoethanol	Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
<b>Inhalation</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

## Section 4. First aid measures

	pUC 18 DNA Control Plasmid	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
	1.22 M 2-mercaptoethanol	Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
<b>Skin contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
	pUC 18 DNA Control Plasmid	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
	1.22 M 2-mercaptoethanol	Get medical attention immediately. Call a poison center or physician. Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
<b>Ingestion</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
	pUC 18 DNA Control Plasmid	Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

## Section 4. First aid measures

1.22 M 2-mercaptoethanol

Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### 4.2 Most important symptoms/effects, acute and delayed

#### Potential acute health effects

<b>Eye contact</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Causes eye irritation.  No known significant effects or critical hazards. Causes serious eye damage.
<b>Inhalation</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Skin contact</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. May cause an allergic skin reaction.
<b>Ingestion</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.

#### Over-exposure signs/symptoms

<b>Eye contact</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells  pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Adverse symptoms may include the following:  irritation watering redness No specific data. Adverse symptoms may include the following: pain watering redness
<b>Inhalation</b>	: <input checked="" type="checkbox"/> L2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data.  No specific data. No specific data.

## Section 4. First aid measures

<b>Skin contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data.  No specific data. Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Ingestion</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data.  No specific data. Adverse symptoms may include the following: stomach pains

### 4.3 Indication of immediate medical attention and special treatment needed, if necessary

<b>Notes to physician</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells  pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.  Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.  Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
<b>Specific treatments</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific treatment.  No specific treatment. No specific treatment.
<b>Protection of first-aiders</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells  pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.  No action shall be taken involving any personal risk or without suitable training.  No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### 5.1 Extinguishing media

<b>Suitable extinguishing media</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire.
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## Section 5. Fire-fighting measures

**Unsuitable extinguishing media** :  XL2-Blue MRF' ultracompetent cells  
 pUC 18 DNA Control Plasmid  
 1.22 M 2-mercaptoethanol

None known.  
 None known.  
 None known.

### 5.2 Special hazards arising from the substance or mixture

**Specific hazards arising from the chemical** :  XL2-Blue MRF' ultracompetent cells  
 pUC 18 DNA Control Plasmid  
 1.22 M 2-mercaptoethanol

In a fire or if heated, a pressure increase will occur and the container may burst.  
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**Hazardous thermal decomposition products** :  XL2-Blue MRF' ultracompetent cells  
 pUC 18 DNA Control Plasmid  
 1.22 M 2-mercaptoethanol

Decomposition products may include the following materials:  
 carbon dioxide  
 carbon monoxide  
 sulfur oxides  
 halogenated compounds  
 metal oxide/oxides  
 No specific data.  
 Decomposition products may include the following materials:  
 carbon dioxide  
 carbon monoxide  
 sulfur oxides  
 halogenated compounds  
 metal oxide/oxides

### 5.3 Advice for firefighters

**Special protective actions for fire-fighters** :  XL2-Blue MRF' ultracompetent cells  
 pUC 18 DNA Control Plasmid  
 1.22 M 2-mercaptoethanol

Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.  
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 Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** :  XL2-Blue MRF' ultracompetent cells  
 pUC 18 DNA Control Plasmid  
 1.22 M 2-mercaptoethanol

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.  
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 Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

<b>For non-emergency personnel</b>	:	XL2-Blue MRF' ultracompetent cells	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
		pUC 18 DNA Control Plasmid	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.
		1.22 M 2-mercaptoethanol	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
<b>For emergency responders</b>	:	XL2-Blue MRF' ultracompetent cells	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
		pUC 18 DNA Control Plasmid	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
		1.22 M 2-mercaptoethanol	If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
<b>6.2 Environmental precautions</b>	:	XL2-Blue MRF' ultracompetent cells	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
		pUC 18 DNA Control Plasmid	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
		1.22 M 2-mercaptoethanol	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

### 6.3 Methods and materials for containment and cleaning up



## Section 6. Accidental release measures

<b>Methods for cleaning up</b>	: XL2-Blue MRF' ultracompetent cells	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	pUC 18 DNA Control Plasmid	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	1.22 M 2-mercaptoethanol	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

## Section 7. Handling and storage

### 7.1 Precautions for safe handling

<b>Protective measures</b>	: XL2-Blue MRF' ultracompetent cells	Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
	pUC 18 DNA Control Plasmid	Put on appropriate personal protective equipment (see Section 8).
	1.22 M 2-mercaptoethanol	Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
<b>Advice on general occupational hygiene</b>	: XL2-Blue MRF' ultracompetent cells	Potentially biohazardous material. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
	pUC 18 DNA Control Plasmid	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8

## Section 7. Handling and storage

1.22 M 2-mercaptoethanol

for additional information on hygiene measures. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

### 7.2 Conditions for safe storage, including any incompatibilities

:  XL2-Blue MRF' ultracompetent cells

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

pUC 18 DNA Control Plasmid

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

1.22 M 2-mercaptoethanol

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

### 7.3 Specific end use(s)

#### Recommendations

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Industrial applications, Professional applications.

Industrial applications, Professional applications.

Industrial applications, Professional applications.

#### Industrial sector specific solutions

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Not applicable.

Not applicable.

Not applicable.

## Section 8. Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
<input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells Glycerol	<b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 10 mg/m <sup>3</sup> 8 hours. Form: Total dust
	<b>OSHA PEL (United States, 2/2013).</b> TWA: 5 mg/m <sup>3</sup> 8 hours. Form: Respirable fraction TWA: 15 mg/m <sup>3</sup> 8 hours. Form: Total dust
Dimethyl sulfoxide	<b>AIHA WEEL (United States, 10/2011).</b> TWA: 250 ppm 8 hours.
Potassium chloride	None.
<b>1.22 M 2-mercaptoethanol</b> 2-Mercaptoethanol	<b>AIHA WEEL (United States, 10/2011).</b> <b>Absorbed through skin.</b> TWA: 0.2 ppm 8 hours.
Sodium chloride	None.

### 8.2 Exposure controls

#### Appropriate engineering controls

- : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

#### Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

#### Individual protection measures

##### Hygiene measures

- :  Handle as biohazard material (Biosafety level 1). Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

##### Eye/face protection

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

##### Skin protection

##### Hand protection

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

## Section 8. Exposure controls/personal protection

- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** :  Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Liquid.
	pUC 18 DNA Control Plasmid	Liquid.
	1.22 M 2-mercaptoethanol	Liquid.
<b>Color</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	1.22 M 2-mercaptoethanol	Not available.
<b>Odor</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	1.22 M 2-mercaptoethanol	Not available.
<b>Odor threshold</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	1.22 M 2-mercaptoethanol	Not available.
<b>pH</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	6.4
	pUC 18 DNA Control Plasmid	7.5
	1.22 M 2-mercaptoethanol	Not available.
<b>Melting point</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	0°C (32°F)
	1.22 M 2-mercaptoethanol	Not available.
<b>Boiling point</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	100°C (212°F)
	1.22 M 2-mercaptoethanol	Not available.
<b>Flash point</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	1.22 M 2-mercaptoethanol	Not available.
<b>Evaporation rate</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not available.
	pUC 18 DNA Control Plasmid	Not available.
	1.22 M 2-mercaptoethanol	Not available.
<b>Flammability (solid, gas)</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells	Not applicable.
	pUC 18 DNA Control Plasmid	Not applicable.
	1.22 M 2-mercaptoethanol	Not applicable.

## Section 9. Physical and chemical properties

<b>Lower and upper explosive (flammable) limits</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Vapor pressure</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Vapor density</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Relative density</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Solubility</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Soluble in the following materials: cold water and hot water. Easily soluble in the following materials: cold water and hot water. Soluble in the following materials: cold water and hot water.
<b>Partition coefficient: n-octanol/water</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Auto-ignition temperature</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Decomposition temperature</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.
<b>Viscosity</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Not available. Not available. Not available.

## Section 10. Stability and reactivity

<b>10.1 Reactivity</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific test data related to reactivity available for this product or its ingredients. No specific test data related to reactivity available for this product or its ingredients. No specific test data related to reactivity available for this product or its ingredients.
<b>10.2 Chemical stability</b>	: XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	The product is stable. The product is stable. The product is stable.

## Section 10. Stability and reactivity

<b>10.3 Possibility of hazardous reactions</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous reactions will not occur.
<b>10.4 Conditions to avoid</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data.  No specific data. No specific data.
<b>10.5 Incompatible materials</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials. May react or be incompatible with oxidizing materials.
<b>10.6 Hazardous decomposition products</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells  pUC 18 DNA Control Plasmid  1.22 M 2-mercaptoethanol	Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## Section 11. Toxicological information

### 11.1 Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
<input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells				
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
Dimethyl sulfoxide	LD50 Dermal	Rat	40000 mg/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Potassium chloride	LD50 Oral	Rat	2600 mg/kg	-
<b>1.22 M 2-mercaptoethanol</b>				
2-Mercaptoethanol	LD50 Dermal	Rabbit	200 mg/kg	-
	LD50 Oral	Rat	244 mg/kg	-
Sodium chloride	LD50 Oral	Rat	3000 mg/kg	-

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
<input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells					
Glycerol	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
Dimethyl sulfoxide	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-

## Section 11. Toxicological information

Potassium chloride  <b>1.22 M 2-mercaptoethanol</b> 2-Mercaptoethanol Sodium chloride	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Mild irritant	Rabbit	-	100 milligrams	-
	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Eyes - Severe irritant	Rabbit	-	2 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	10 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 500 milligrams	-

### Sensitization

Not available.

### Mutagenicity

Not available.

### Carcinogenicity

Not available.

### Reproductive toxicity

Not available.

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
<b>1.22 M 2-mercaptoethanol</b> 2-Mercaptoethanol	Category 3	Not applicable.	Respiratory tract irritation

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

### Information on the likely routes of exposure

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Routes of entry anticipated: Oral, Dermal, Inhalation.  
Not available.  
Routes of entry anticipated: Oral, Dermal, Inhalation.

### Potential acute health effects

#### Eye contact

:  XL2-Blue MRF' ultracompetent cells  
pUC 18 DNA Control Plasmid  
1.22 M 2-mercaptoethanol

Causes eye irritation.

No known significant effects or critical hazards.  
Causes serious eye damage.

## Section 11. Toxicological information

<b>Inhalation</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Skin contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. May cause an allergic skin reaction.
<b>Ingestion</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards. No known significant effects or critical hazards. No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

<b>Eye contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells  pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	Adverse symptoms may include the following:  irritation watering redness No specific data. Adverse symptoms may include the following: pain watering redness
<b>Inhalation</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data. No specific data.
<b>Skin contact</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: pain or irritation redness blistering may occur
<b>Ingestion</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No specific data. No specific data. Adverse symptoms may include the following: stomach pains

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

#### Potential chronic health effects



## Section 11. Toxicological information

<b>General</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
<b>Carcinogenicity</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Mutagenicity</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Teratogenicity</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Developmental effects</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.
<b>Fertility effects</b>	: <input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells pUC 18 DNA Control Plasmid 1.22 M 2-mercaptoethanol	No known significant effects or critical hazards.  No known significant effects or critical hazards. No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Route	ATE value
<b>XL2-Blue MRF' ultracompetent cells</b> Oral	136842.1 mg/kg
<b>1.22 M 2-mercaptoethanol</b> Oral	2417.3 mg/kg
Dermal	2105.3 mg/kg
Inhalation (vapors)	21.05 mg/l

## Section 12. Ecological information

### 12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
<input checked="" type="checkbox"/> XL2-Blue MRF' ultracompetent cells Glycerol Dimethyl sulfoxide	Acute LC50 54000 mg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Acute LC50 25000 ppm Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
Potassium chloride	Acute LC50 34000000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 100 ul/L Marine water	Algae - Ulva lactuca	72 hours
	Acute EC50 1337000 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 9.24 g/L Fresh water	Algae - Desmodesmus subspicatus	72 hours

## Section 12. Ecological information

<b>1.22 M 2-mercaptoethanol</b> Sodium chloride	Acute EC50 141460 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 12.77 mg/l Fresh water	Crustaceans - Pseudosida ramosa - Neonate	48 hours
	Acute LC50 880000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute EC50 2430000 µg/l Fresh water	Algae - Navicula seminulum	96 hours
	Acute EC50 519.6 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute IC50 6.87 g/L Fresh water	Aquatic plants - Lemna minor	96 hours
	Acute LC50 1661 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 1000000 µg/l Fresh water	Fish - Morone saxatilis - Larvae	96 hours
	Chronic LC10 781 mg/l Fresh water	Crustaceans - Hyalella azteca - Juvenile (Fledgling, Hatchling, Weanling)	3 weeks
	Chronic NOEC 6 g/L Fresh water	Aquatic plants - Lemna minor	96 hours
Chronic NOEC 0.314 g/L Fresh water	Daphnia - Daphnia pulex	21 days	
Chronic NOEC 100 mg/l Fresh water	Fish - Gambusia holbrooki - Adult	8 weeks	

### 12.2 Persistence and degradability

Not available.

### 12.3 Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
<input checked="" type="checkbox"/> <b>XL2-Blue MRF' ultracompetent cells</b>			
Glycerol	-1.76	-	low
Dimethyl sulfoxide	-1.35	3.16	low
Potassium chloride	-0.46	-	low
<b>1.22 M 2-mercaptoethanol</b>			
2-Mercaptoethanol	-0.056	-	low

### 12.4 Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**12.5 Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

### 13.1 Waste treatment methods

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 13. Disposal considerations

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## Section 14. Transport information

### Regulatory information

DOT / IMDG / IATA : Not regulated.

## Section 15. Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**U.S. Federal regulations** : **United States inventory (TSCA 8b)**: All components are listed or exempted.  
**Clean Water Act (CWA) 311**: Edetic acid

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** :  listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** : Immediate (acute) health hazard

#### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
<input checked="" type="checkbox"/> <b>XL2-Blue MRF' ultracompetent cells</b>						
Glycerol	≥10 - ≤25	No.	No.	No.	Yes.	No.
Dimethyl sulfoxide	≤10	Yes.	No.	No.	Yes.	No.
Potassium chloride	≤3	No.	No.	No.	Yes.	No.
<b>1.22 M 2-mercaptoethanol</b>						
2-Mercaptoethanol	<10	Yes.	No.	No.	Yes.	No.

## Section 15. Regulatory information

Sodium chloride	≤8.8	No.	No.	No.	Yes.	No.
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### State regulations

- Massachusetts** : The following components are listed: SUCROSE DUST; GLYCERINE MIST; 2-MERCAPTOETHANOL
- New York** : None of the components are listed.
- New Jersey** : The following components are listed: DIMETHYL SULFOXIDE; METHANE, SULFINYLBIS-; GLYCERIN; 1,2,3-PROPANETRIOL; THIOGLYCOL; 2-MERCAPTOETHANOL
- Pennsylvania** : The following components are listed: .ALPHA.-D-GLUCOPYRANOSIDE, .BETA.-D-FRUCTOFURANOSYL; 1,2,3-PROPANETRIOL; ETHANOL, 2-MERCAPTO-

### California Prop. 65

No products were found.

### International regulations

#### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

#### Montreal Protocol (Annexes A, B, C, E)

Not listed.

#### Stockholm Convention on Persistent Organic Pollutants

Not listed.

#### Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

#### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

### Inventory list

- Australia** : All components are listed or exempted.
- Canada inventory** : All components are listed or exempted.
- China** : Not determined.
- Europe** : All components are listed or exempted.
- Japan** :  **Japan inventory (ENCS)**: Not determined.  
 **Japan inventory (ISHL)**: Not determined.
- Malaysia** : Not determined.
- New Zealand** : Not determined.
- Philippines** : Not determined.
- Republic of Korea** : All components are listed or exempted.
- Taiwan** : All components are listed or exempted.
- Turkey** :  Not determined.

## Section 16. Other information

### History

- Date of issue** : 10/17/2016
- Date of previous issue** : 10/27/2015.
- Version** : 4

Indicates information that has changed from previously issued version.

### Notice to reader

## Section 16. Other information

**Disclaimer:** The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.